Abstract

This bachelor thesis examines the possibilities of suppression of the oxygen signal of carbon paste electrode by modification of the electrode with a reductant. Two modifiers were chosen: sodium sulphite and sodium hypophosphite. The unmodified carbon paste electrode was used for the comparison. The possibilities of using these developed electrodes were verified via determination of metronidazole by the differential pulse voltammetry.

The conditions for the determination of metronidazole were optimized; for unmodified carbon paste electrode (CPE) buffer of pH 10 was selected as the optimum medium, for carbon paste electrode modified with sodium sulphite (S-CPE) buffer of pH 7 was selected, and finally for carbon paste electrode modified with sodium hypophosphite (F-CPE) buffer of pH 4 was selected as the optimum medium. In this media, concentration dependences were measured and detection and quantification limits were obtained. The possibility of increase of the sensitivity of determination by the accumulation step was studied, but the accumulation of metronidazole was not observed after 5 minutes.

The detection and quantification limits for CPE were $1{,}7\times10^{-5}$ mol/l and $5{,}6\times10^{-5}$ mol/l, for S-CPE $6{,}8\times10^{-5}$ mol/l and $2{,}3\times10^{-4}$ mol/l and finally for F-CPE $1{,}3\times10^{-5}$ mol/l and $4{,}3\times10^{-5}$ mol/l.

The developed methods of determination of metronidazole were then verified by its determination in the real sample of Entizol tablets containing 250 mg of metronidazole. Concentration of the analyte was determined by standard addition method and then compared with reversed phase high- performance liquid chromatography (RP-HPLC) also using the standard addition method. The best consensus with the declared amount of metronidazole in tablet form was found using the F-CPE, in contrary the worst consensus was found using the CPE.